

MEDICAL OFFICERS OF SCHOOLS  
ASSOCIATION

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The  
**Care of the Teeth  
during School Life**

BY

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President, School Dentists' Society*

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# THE CARE OF THE TEETH DURING SCHOOL LIFE

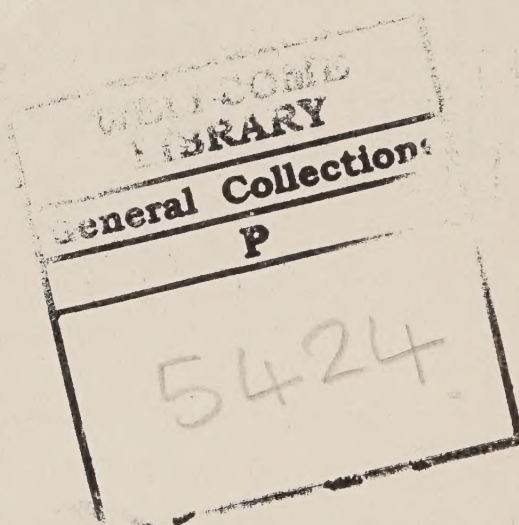
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# The Care of the Teeth during School Life.\*

*An Address read before the Medical Officers of Schools Association*

By R. DENISON PEDLEY, F.R.C.S. Ed.,  
L.D.S. Eng.

President of the School Dentists' Society.

So much has been said and written concerning this subject during the past few years that it seems difficult to throw fresh light upon the matter. An article in the August number of *Public Health*, by Dr. Stanley Colyer, reminds me, however, that it is again necessary to emphasise what we believe is essential to the welfare of the school children so far as their teeth are concerned.

The importance of doing so is the more evident because the British public through the Educational Authorities look to us for guidance; and as they have to furnish the means by which our suggested schemes may be carried out, the British public is the ultimate Court of Appeal.

After more than twenty years' work the Schools Committee of the British Dental Association and the School Dentists' Society have convinced all competent authorities that *at least* two-thirds or 75 per cent. of the children are suffering from defective teeth.

Now that the medical inspection of children in the elementary schools is making evident to the school medical officers that dental diseases are the most prevalent of all diseases, they and the Educational Authorities are face to face with a very serious problem, for I need scarcely remind you that according to the Education (Administrative Provisions) Act of 1907 for England and Wales, and the Education Act for Scotland, 1908, the object of medical inspection is that it must be followed by treatment. As the number of children

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\* The illustrations we owe to the courtesy of Messrs. Blackie & Son Limited. They are taken from "Our Teeth," by R. Denison Pedley and Frank Harrison.



on the registers of public elementary schools in England and Wales alone is nearly six millions, more than four millions will require treatment for dental diseases alone, apart from the general medical treatment of which it is only a part.

The presence of so vast an amount of disease among children is at least an incentive to try and find some remedy, however discouraging at first sight it may appear owing to the very magnitude of the task.

On the threshold of inquiry into ways and means we are encouraged by the facts: (1) All agree that our children should enjoy good health not only because they may take advantage of the education provided, but that they may become effective workers; (2) There is no disease which yields so readily to treatment as dental disease and none whereby the body may be rendered so healthy. For it is a peculiarity of dental disorders that they bring innumerable evils in their train, not the least of which evils is that of lowering the body's vitality and thus opening wide a door for other diseases to enter.

In order to trace the factors concerned in the production of dental diseases it is necessary to say a few words with regard to their structure and development. The method of their destruction will be considered later, and I shall conclude with a brief discussion as to the remedial measures to be taken.

I have considered all these matters in a treatise aided by my colleague, Mr. Harrison, of Sheffield, and his beautiful illustrations. Some of these I shall show in order to elucidate the subject.\*

If we examine a section of the jaw at a very early stage of development it is clearly seen that teeth are dermal structures. They are built up of growing cells, and out of such cellular structures the perfect tooth is formed. The crowns of the teeth are completed in soft tissue, and gradually become impregnated with lime salts, conveyed to them through the blood stream. At birth the crowns of the temporary teeth are almost completed and the jaws contain in addition the germs of all the permanent teeth.

It is evident, therefore, that in the early stages of tooth building the proper nourishment and growth are dependent upon maternal supplies.

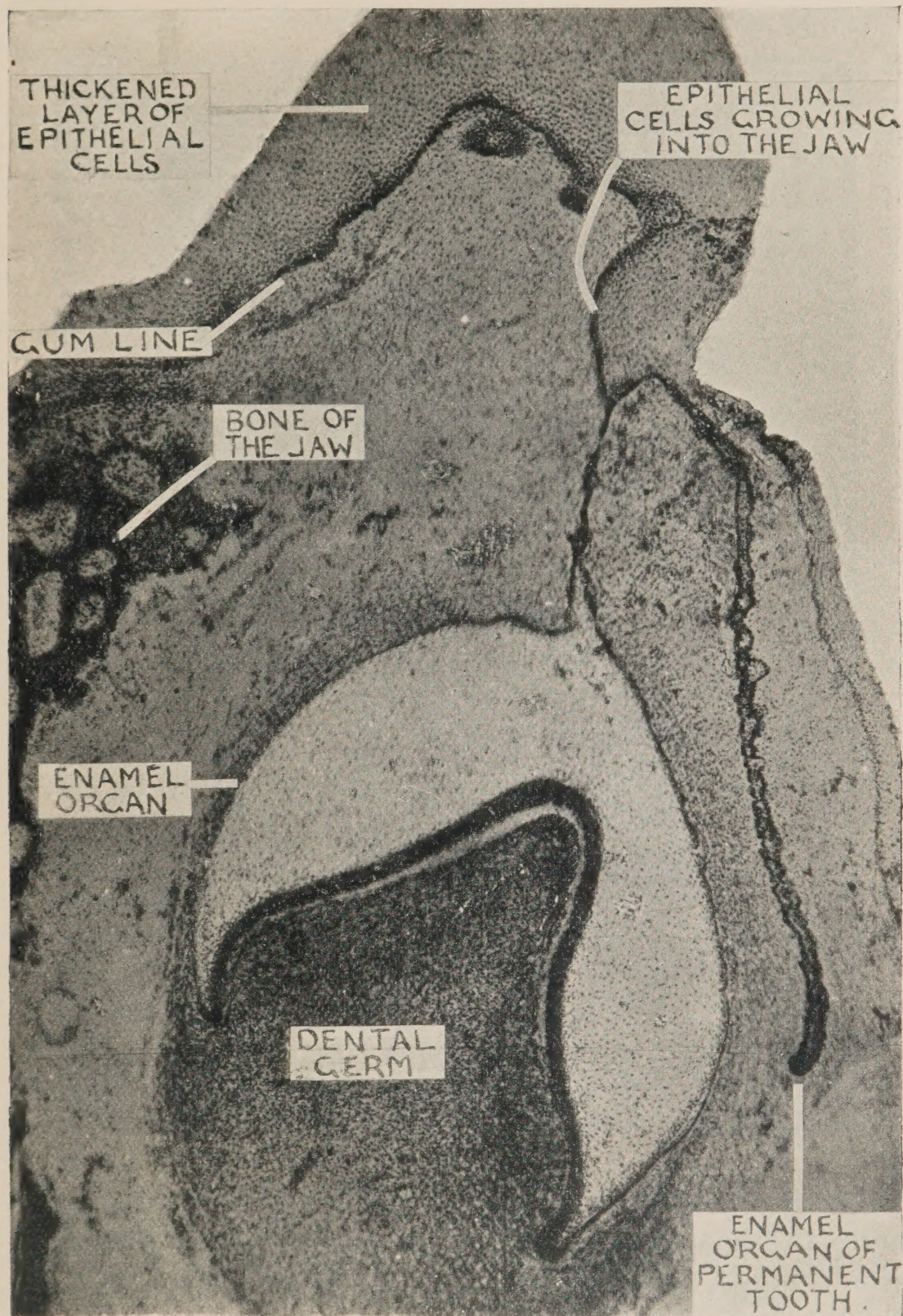
Very soon after birth the crowns of the temporary teeth

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\* "Our Teeth: How built up; how destroyed; how preserved." Blackie and Sons, London and Glasgow.



are completed, and during the next two or three years the crowns of the permanent set will be completed with the exception of those of the wisdom teeth, which are formed at

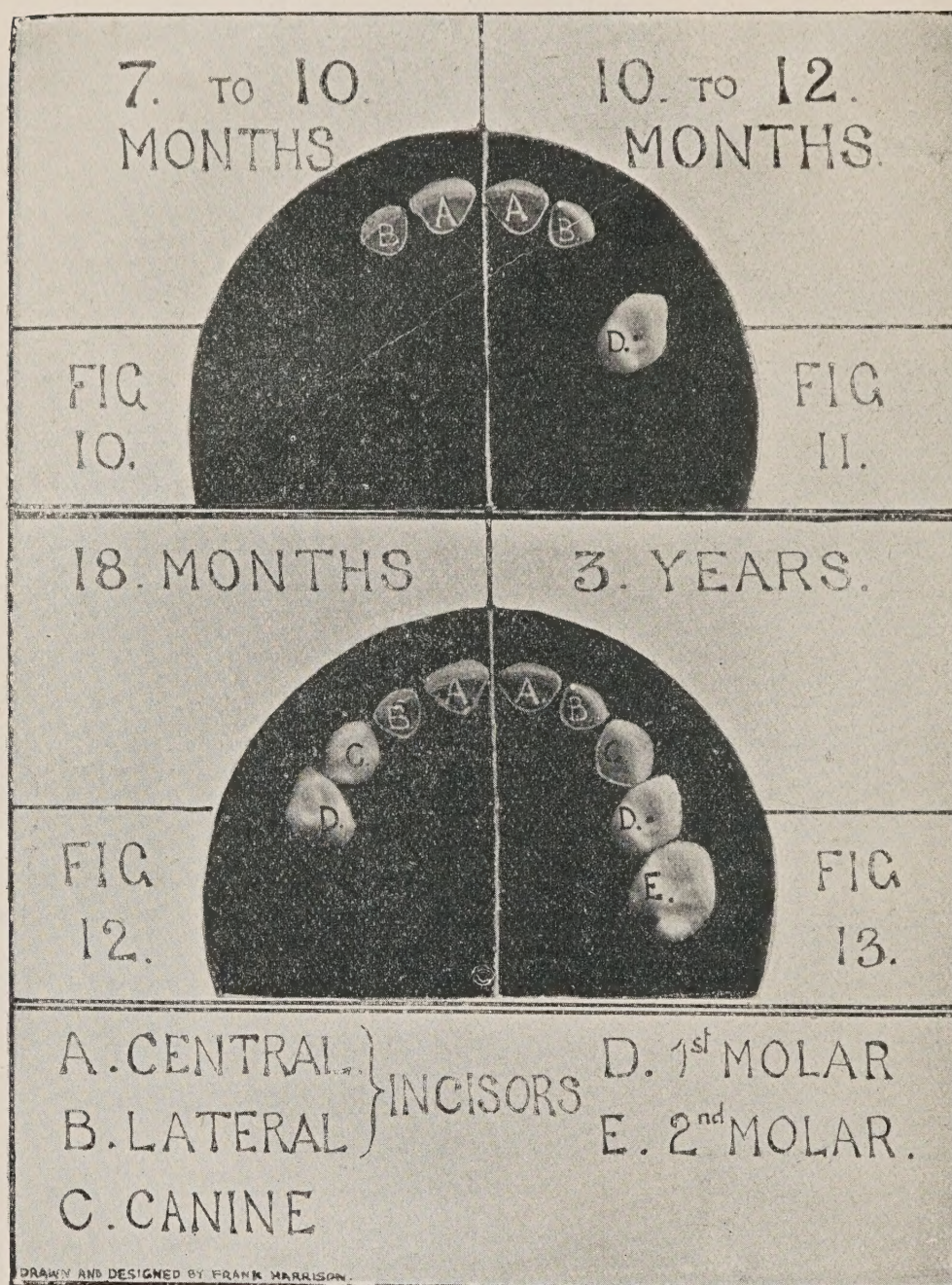


a later stage. During the first nine months the growing teeth, both temporary and permanent, are dependent—or should be—upon maternal supplies.



## THE CARE OF THE TEETH

The child's teeth commence "their emergence above the gum\*" at seven months, and at three years twenty teeth are in position for masticating purposes—ten in each jaw. These teeth emerge in pairs, the front teeth first, leaving



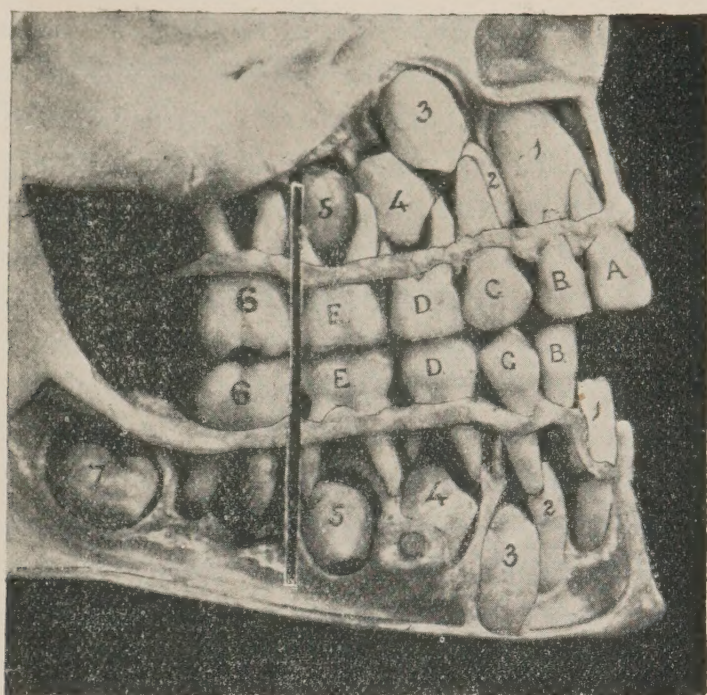
sufficient room by elongation of the ramus for the back teeth to oppose one another. As the crowns of the teeth pass through the gums the roots are gradually added and the bone is built up around them.

At six years the first permanent teeth appear behind the

\* A term we owe to Professor Sherrington, F.R.S., and infinitely preferable to the word "erupt" or "eruption."



second temporary molars—the dates, of course, are approximate—the roots of the temporary teeth are gradually eaten away by bone cells, and at twelve or thirteen years these are all replaced by permanent teeth, with the exception of the wisdom teeth, which emerge between seventeen and twenty-one years.



The most active periods of growth for the temporary set are six months before birth and three months afterwards. For the permanent teeth, from birth until three or four years of age, so far as their crowns are concerned, and as these are the only portions of the teeth exposed to the active influences which so often destroy them, it is worthy of special notice that when once these crowns are formed or laid down in hard tissue—*calcified*—they are for the future unalterable.

When these facts are borne in mind it is not difficult for the school medical officer to realise that the factory worker's child may inherit weak dental tissue, however intelligent the mothers may be.

In these matters nature is very kind, for in spite of poverty, riches, and other disorders of the body politic, the majority of our children are born healthy, and the mothers are in the majority of cases provided with the nourishment the infants require. It is when this nourishment fails and the experimental process commences of feeding a healthy babe that the pitfalls of contaminated milk, patent foods—all highly recommended by medical men—starchy foods, and



other abominations beset the infant life and the growth of the infant teeth. If we add to these the baby comforter, the absence of fresh air, and, above all, the appalling ignorance of so many mothers, how can we expect that teeth can be adequately nourished?

When saved from all these troubles of its environment the children whose teeth have emerged with little trouble and whose jaws are incessantly trying to find some work to do are fed upon the softest food. No distinction is made between hunger and thirst, and where milk is available, food is cooked or boiled in it. Gravies, stews, minced meat, etc., are given, and all by the doctor's orders. By precept and example children are brought up in this atmosphere. Hard food is avoided, and the grinding of food which produces an abundance of healthy saliva is practically in abeyance.

The change has been a very gradual one; but coincident with this change during the last thirty or forty years is the alteration in our staple food, *bread*.

The steel mill has gradually replaced the stone mill, and our wheatmeal flour is now entirely deprived of its fibrous material. The most effectual cleanser of the teeth during thousands of years has practically gone.

To encourage the popular taste for white bread a process has now commenced of bleaching the flour. What the effect on the teeth may be we do not yet know, but expert opinion with regard to the general effect is worth notice:—"There is by all bleaching actions necessarily a loss of food value, the degree of loss depending directly on the extent of treatment. In addition to this actual loss in food value, the fact should be emphasised that bleaching has a deleterious effect in that it throws extra labour on the digestive system and means that it does not only act upon the flour, but upon the person consuming the flour by making digestion more difficult."\*

Nutritious and easy of digestion as unbleached flour may be, we believe that the absence of fibrous material deprives the muscular coats of the intestine of necessary exercise. The bread now made from wheat-meal flour clings to the teeth, is unfelt by the lips and tongue, rapidly undergoes fermentation, and is very destructive to the teeth.

I now pass on to consider briefly that disease by which most teeth are destroyed.

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\* United States Department of Agriculture, Adulterated and Misbranded Bleached Flour, vide evidence of Dr. Gustav Mann.



*Dental Caries* has a bacterial origin. When particles of food are left upon the teeth fermentation takes place with the production of an acid. At some weak spot on the enamel the lime salts are dissolved. The enamel prisms split up, disappear, and the armour plate of the tooth is penetrated. The acid-producing bacteria now act upon the dentine or ivory of the tooth, and soon a softened area of gelatine is found. Simultaneously with this process the dentinal tubes are permeated with bacteria, which travel gradually toward the centre chamber, and in time infect the pulp. The softened gelatine of the affected area is by bacteria peptonised, and a cavity is formed for the accumulation of food and decomposing material. It is at this stage that the conservative treatment by the dentist is so valuable. For when this cavity is enlarged, all frail edges of enamel and carious dentine are removed, then suitable fillings are introduced which protect the pulp chamber and render the tooth serviceable again for many years. Once the central chamber is infected, the bloodvessels and nerves contained therein are rapidly destroyed. Decomposition takes place to the apices of the roots, and as this septic material accumulates, it is sooner or later, by the pressure of mastication from above, injected into that part of the jaw in which the roots lie buried.

The sequelæ are numerous, from simple inability to masticate food to the poisoning of the whole body, from a simple alveolar abscess to loss of portions of the jaw and even of life itself.

From all the investigations made during the past fifty years we have unmistakable evidence that dental diseases have existed in all ages and among all races of the past.\*

With the progress of our civilisation a gradual change has taken place, the character of our food and our teeth have suffered accordingly. We have no statistical evidence to prove that any material change has taken place during the past fifty years, but all who have been practising dental surgery any length of time believe that dental disease is rapidly on the increase.

From a public health point of view the treatment of dental disease has now to be considered.

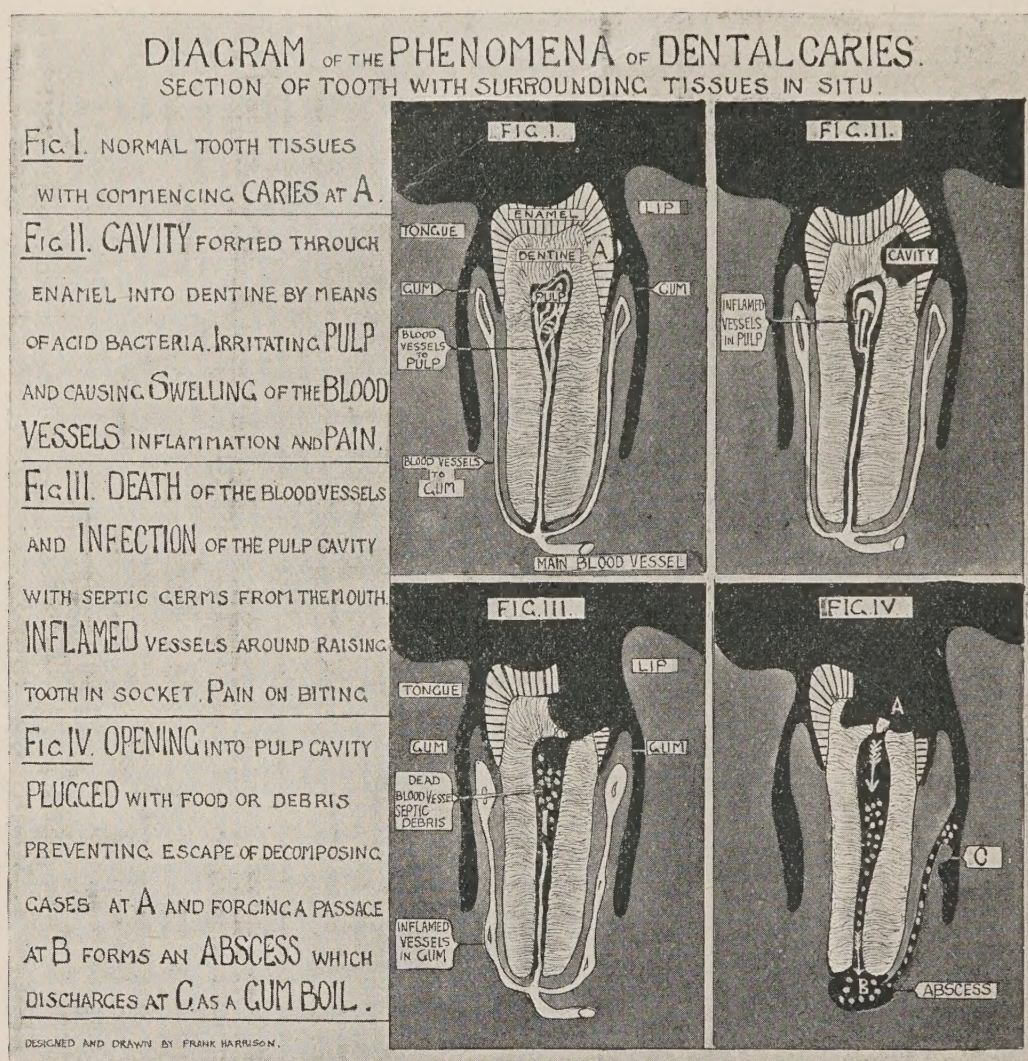
Dr. Stanley Colyer believes that "the only reasonable way to meet this disease is by way of prevention," and with

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\* Mummery, *Transactions of the Odontological Society*, 1870; "Our Teeth," by Pedley and Harrison. Blackie and Son, London and Glasgow, 1908.



this statement we may entirely agree; but prevention needs defining. That it is simple, and "consists merely in oral cleanliness," is open to grave doubt, however authoritatively dental surgeons may have spoken. Let us suppose that instead of dental caries we are discussing the question of the treatment of tuberculosis. All believe in prevention. It is the keynote of public health. Should I assert "we have it on the highest medical authority that in fresh air tuberculosis



does not flourish; that the matter is simple; all you have to do is to teach the children to have fresh air," it will be at once seen that I have attacked anything but a simple problem and omitted a large number of factors in the production of tuberculosis. Furthermore, it should be conceded that prevention includes the early treatment of existing disease, especially when we know that at least four millions of children are suffering from dental disease in some form or another, each child having on an average three carious teeth. The importance of early treatment is brought home more



clearly to the mind when we remember that the protective influence of the blood, which enables so many organs of the body to defend themselves and ultimately recover, is practically absent from the teeth. That dental disease is for the most part a progressive destruction of tooth substance with the vascular and nervous structures contained therein, the necrotic remains of which lie buried in living tissue, to taint the freshest air, to spoil the best of food, and to introduce a subtle poison which so often undermines the health of a growing child.

I am, however, in hearty agreement with many of the suggestions contained in Dr. Stanley Colyer's paper. He believes that school medical officers and teachers should be trained. I would go even a step further. Every medical student should have an elementary knowledge of dental disease, as he now does with regard to the eye, the ear, etc. The subject is an optional one, and until now it has been ignored. Occasional questions should be set in pass examinations. "What is dental caries?" is a type. Every general hospital should have its properly equipped dental department, where students should learn for at least three months how teeth are *saved* as well as lost. The teachers in all elementary schools should be instructed by suitable lectures and by suitable literature to know something of the prevention of dental disease. Every effort should be made to encourage them to teach the scholars by diagrams and object lessons how valuable teeth are in the economy of the body. The teachers are in such close contact with the children. They have so much sympathetic consideration for and with them that I believe a vast amount of preventive work can be carried out under suitable conditions. It is, however, necessary to enter into the teacher's mind on this matter, and remember that the prevention of dental disease can only be a small portion of their work. Theoretical lessons are given in the schools on cleanliness, fresh air, sunshine, etc. Teachers spend much time encouraging children to be punctual, to bring handkerchiefs—the breathing exercise cannot be done without them. To clean their boots, because when cleaned, boots last much longer, etc., etc. Although no time is allotted for all this on the school time table. The difficulties, therefore, of a teacher are great. The first great obstacle to progress in this direction is the home from which every child receives its early training. The second obstacle is want of time.



There is much sound philosophy in the teaching of Charles Dickens at Dotheboys Hall, "When the boy knows this out of a book, he goes and does it."\* The doctrine of cleanliness is preached every day to tens of thousands of scholars, and like many other doctrines, is simply smothered when it reaches home.

What the teachers want is to see that the children of the poor actually do something toward their own physical well-being. As John Wesley has wisely said, "Certainly this is a duty, not a sin"; "Cleanliness is indeed next to godliness."†

If forty minutes are given to scripture teaching, twenty minutes should be given to the gospel of cleanliness in a practical form.

In every large school basins should be provided with water taps over them and unbreakable cups, a tooth-brush for every child with its number, racks where they may be placed with the names and numbers on. The "tooth-brush drill" will then be a reality instead of a farce, and this wholesome recreation will save much money in the future.

The appointment of dentists to treat existing disease I regard not only as a method of prevention but as absolutely essential to the welfare of the children. I speak from many years' experience, having given part of a day in each week to such work among the children of the poor. The work is most arduous, and should be well paid. The dentists will be forthcoming when they are required.

The cost will be great I admit, but it is a mere trifle to the benefits which the children will acquire in increased strength and energy.

A recent Report, issued by the L.C.C., on School Dentistry in Germany, by Mr. Blair, the Education Officer, will show the forward movement going on in that country.

A large amount of good work is being carried out in this country; the publication of our statistics has led to the definite treatment of dental diseases in a large number of public and private schools. Some seventy appointments of dental surgeons have also been made to Poor Law schools, district schools, and workhouse schools in England and Wales, which means that a yearly average of ten thousand of the children, who are fed, clothed, and educated by the guardians of the poor, at the expense of the State, have, in

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\* Nicholas Nickleby, p. 129.

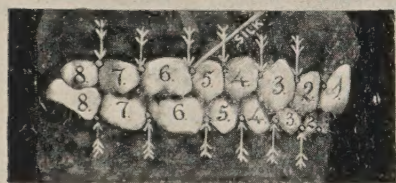
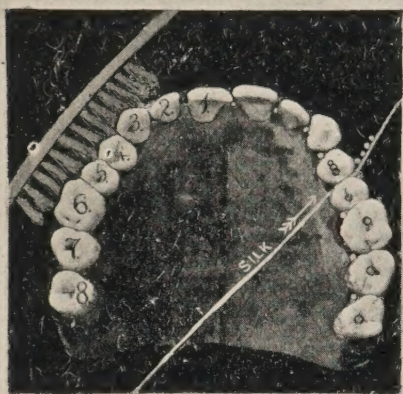
† Sermon xcii.



addition to ordinary medical supervision, their teeth periodically attended to from the ages of five to fifteen years, when they are given a start in life to join the army of industrial workers. It is extremely difficult to trace these children in after life, because, I need hardly remind you, they are a floating population; but some idea of the large number over a series of years may be gathered from an interesting

## THE CARE OF THE TEETH. BRUSHING AND SILKING.

THE MEDICAMENT USED WHETHER A DENTIFRICE OR GOOD SOAP AND WARM WATER IS NOT SO IMPORTANT AS THE METHOD OF USING



WHEN CLEANING THE TEETH THE GREATEST CARE IS TO BE BESTOWED UPON THE REMOVAL OF FOOD AND DEBRIS FROM BETWEEN THE TEETH. IT IS BEST TO USE A BRUSH WITH BRISTLES CUT TO CONFORM TO AND REACH THOSE SPACES AS SHOWN IN DIAGRAM I.

IN USE THE BRUSH SHOULD NOT BE ALLOWED TO PASS TO AND FRO FROM THE FRONT TO THE BACK TEETH ONLY; BUT WITH A SHORT PRESSING SWEEP FROM THE GUMS TO THE CUTTING EDGE OF THE TEETH. THUS THE STROKE IN THE UPPER JAW IS FROM THE GUM, DOWNWARDS WHILE IN THE LOWER JAW IT IS FROM THE GUM UPWARDS. IN THE DIRECTION OF THE ARROWS IN DIAGRAM II.

USED ONCE A WEEK AN EXCELLENT ADJUNCT TO THE ABOVE AND A GREAT PROTECTION AGAINST DECAY OF THE TEETH CONSISTS IN SILKING, THAT IS, PASSING A STRAND OF SILK EIGHT OR TEN INCHES LONG, HELD TAUT BETWEEN THE INDEX FINGER AND THUMB OF EACH HAND - BETWEEN ALL THE TEETH AND DRAWING IT OUTWARDS FOR AN INCH IN SUCH A MANNER AS NOT TO HURT THE GUM - IF THE SILK IS CUT OR FRAYED IN PASSING BETWEEN THE TEETH, IT IS MOST LIKELY THAT DECAY IS PRESENT REQUIRING IMMEDIATE TREATMENT.

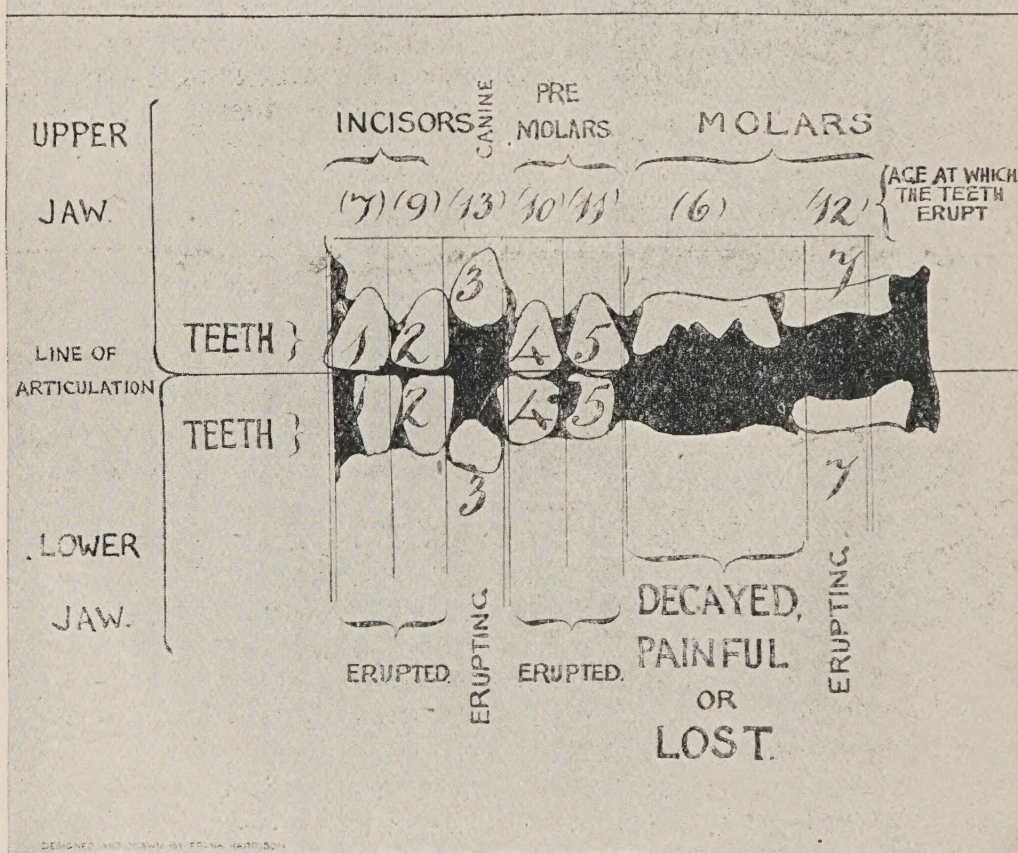
paper on "Children Under the Poor Law,"\* from which we find that from 1897 to 1906 "nearly 13,000 children were sent to various employments from the Poor Law schools of the metropolis" alone. As each metropolitan Poor Law school has long had its dental surgeon—with very few exceptions these boys and girls have undergone regular inspection and treatment during a number of years—their per-

\* A Report to the President of the Local Government Board, by J. T. Macnamara, 1908.



manent teeth have been saved, their mouths have been rendered clean and wholesome, and they have been taught the necessity and the usefulness of the tooth-brush. Out of 13,000, only seventy-five children were returned to the guardians "in consequence of some physical or mental defect for which the Poor Law schools are not responsible." The benefits of this to the young industrial workers are inestimable, especially when we consider how defective are the teeth of so many of our working men and their wives,

### CHART SHOWING THE WANT OF MASTICATING POWER IN 80 % OF CHILDREN AT 12 YEARS.



and also of our domestic servants; and the results are encouraging to those who are engaged in the treatment of these children. It is also satisfactory to acknowledge that there are a number of educated laymen who, as guardians, realise the value of dental supervision.

I have lately sought information from the Home Office as to dental supervision in the reformatory and industrial schools of Great Britain, and, from the fifty-first Report, for the year 1907, I find that in sixty-two of these (including nautical schools) a yearly average of eight thousand three



hundred and eighty-seven (8,387) boys and girls are under dental supervision. We have every reason to believe that this number will go on increasing. The excellent example of appointing whole-time dentists in Cambridge, Norwich, and other centres will be surely followed by the Educational Authorities in other districts.

Even a casual inspection of the recently issued Report of the Royal Commission on the Poor Law will convince the most sceptical that the expenditure on school children will ultimately be a great financial saving, and the Educational Authorities will doubtless freely consult this ponderous volume on questions with which they are concerned. The work shows that our expenditure upon poor relief, education, and public health amounts to nearly sixty million pounds a year. This vast sum needs redistribution, which could be brought about, we believe, by the adoption of preventive measures. We are told that "at least one-half of the total cost of pauperism is swallowed up in direct dealing with sickness,"\* and we little realise how sickness will drag down respectable people to destitution until they are compelled to seek relief from the workhouse or the infirmary. So that if, say, only one-half of this sickness can be saved by careful treatment of children, you will all agree that the redistribution of cost will be a national gain.

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\* Report of the Royal Commission on the Poor Laws, p. 289.











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